

Generalised Architecture for Dynamic Infrastructure Services

GEYSERS - comprising partners from Italy, Germany, Switzerland, Spain, Poland, France, the Netherlands, United Kingdom, Belgium, Greece and India - equips optical infrastructure providers and network operators with a new architecture that enhances their traditional business operations.

GEYSERS

Generalised Architecture for Dynamic Infrastructure Services



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Duration: January 2010 - December 2012

Funding scheme: IP

Total Cost: €10'433'206

EC Contribution: €7'035'000

Contract Number: INFISO-ICT-248657

Main Objectives

The main objective is to enable optical network infrastructure providers to compose logical infrastructures which can be offered to network operators; network operators will then run cost-efficient, dynamic and mission-specific networks by means of integrated control and management techniques. This enables infrastructure providers, network operators and application providers to participate in new business scenarios for supporting services with complex attributes and strict bandwidth requirements. This "next generation telco service" extends the concept of cloud computing to integrate both network and IT resources; it represents a futuristic approach to the Infrastructure as a Service (IaaS) model. In GEYSERS, high-end IT resources at users' premises are fully integrated with the network services procedures, during both the infrastructure planning and connection provisioning phases.

According to this vision of the future of telecoms, GEYSERS specifies and implements a novel optical network architecture able to support 'Optical Network + Any-IT' resource provisioning seamlessly and efficiently. Energy consumption metrics for the end-to-end service routing are part of this efficiency.

GEYSERS defines and implements a novel photonic network architecture

GEYSERS will specify and develop:

- mechanisms that allow infrastructure providers to partition their resources (optical network and/or IT), compose logical infrastructures dynamically, and offer them as a service to network operators. This will be done overcoming the current limitations of (particularly) administrative domain segmentation.
- a Network Control Plane for the optical infrastructure, by extending standard solutions (ASON/GMPLS and PCE), able to couple optical network connectivity and IT services automatically and efficiently, and provide them in 1 step, dynamically and on-demand, including infrastructure re-planning mechanisms.

The GEYSERS outcomes will be validated in an EU-wide optical network test-bed.

Technical Approach

GEYSERS will define, develop and validate an end-to-end network architecture, based on extending standard ones, which is able to create a new planning, provisioning and (ultimately) business framework for network infrastructure providers and network operators (service providers). In this framework, the network infrastructure provider will be able to compose and offer part of its infrastructures (possibly combined with IT resources) as logical (virtual) infrastructures to network operators. Network operators will operate these logical infrastructures with Control Plane (ASON/GMPLS and PCE) technologies to offer coupled, optimized and dynamic

Network+IT provisioning services (ie. interconnections between end-users and IT resources).

Key Issues

GEYSERS will introduce a new architecture that will re-qualify the interworking of legacy planes by means of a logical

infrastructure representation layer for network and IT resources. This will enable a new business model where Infrastructure providers' resources are partitioned and offered dynamically, on demand, to network operators as a service.

Expected Impact

Expected impact of the project with reference to the work-programme 2009-2010 are:

- to establish a breakthrough in the design and implementation of the Future Networks.
- to provide an enhanced Network Control Plane that will enable network operators to provide complex end-to-end services, by seamlessly controlling optical network and IT resources, with dynamic wavelength allocation functionalities and capabilities.
- to (re)plan infrastructure resources on demand. This will lead to an optimized cost-efficient use of infrastructures. These will be key differentiating factors in the business.

GEYSERS will:

- focus on ultra high capacity optical networks based on dynamic wavelength allocation with end-to-end service delivery capability. The Logical Infrastructure Composition Layer (see figure) will overcome network and domain segmentation limitations. The Network Control Plane will support flexible management in a multi-infrastructure operator environment with end-to-end carrier grade performance.

- provide dedicated support for highly IT-reliant distributed mission-critical enterprise applications, by defining a Future Network architecture

that enables infrastructure providers, network operators and application providers to contribute in a business model where complex services with complex attributes can be pooled.

- attract a global interest and generate considerable feedback amongst interdisciplinary stakeholders.

- contribute to global standards and European Intellectual Property. The GEYSERS consortium comprises outstanding European and International actors in the field of optical networking (both commercial and academic). They have the capability to influence standardization and generate Intellectual Property. This will reinforce the position of Europe's industry in both fields. The insights gained in GEYSERS will be used to actively collaborate and push forward the definition of new network standards. In addition, novel networking technologies will lead to patent applications to protect the Intellectual Property of the consortium members.

